Bell Work: Graph each exponential function

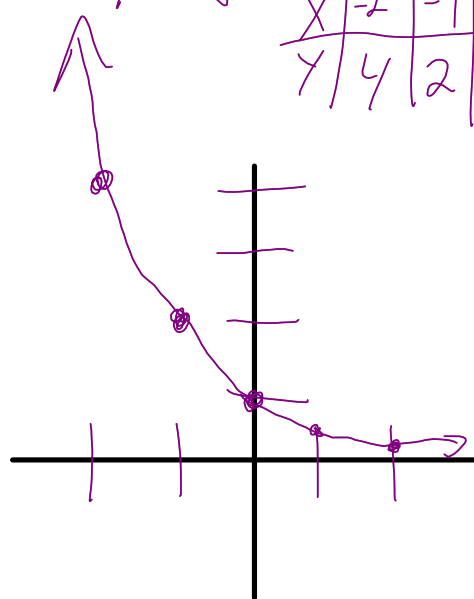$2^{-2} = \frac{1}{2^2}$

1) $y = 2^x$
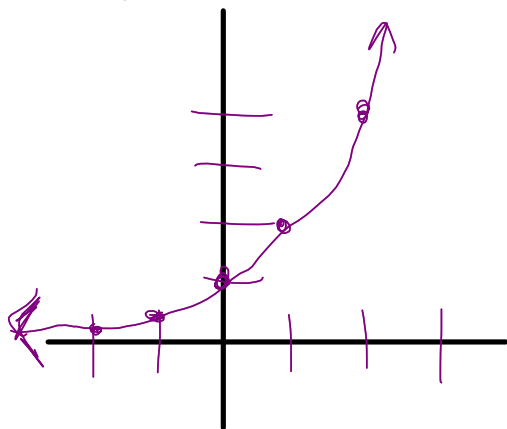
X	-2	-1	0	1	2
Y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4

2) $y = \left(\frac{1}{2}\right)^x$

X	-2	-1	0	1	2
Y	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$

Graph each function as a transformation of its parent function.

reflection x-axis   left 1
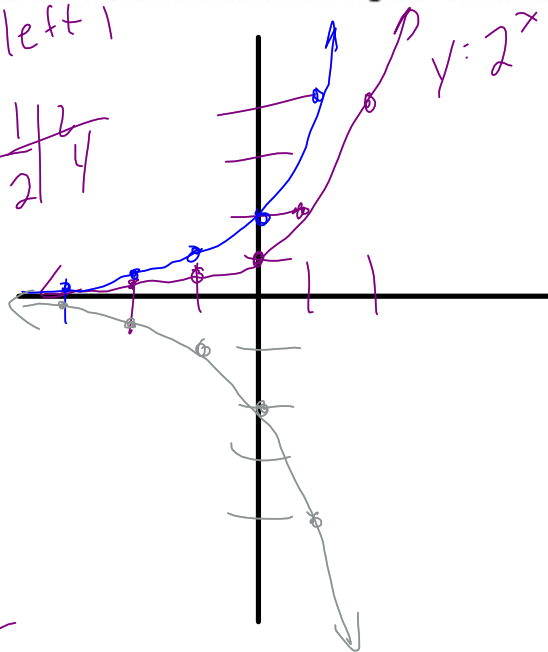
1) $y = -(2)^{x+1}$

$y = 2^x$

x	-2	-1	0	1	2
y	¼	½	1	2	4

$y = 2^{x+1}$

x	-3	-2	-1	0	1
y	¼	½	1	2	4

$y = -(2)^{x+1}$

x	-3	-2	-1	0	1
y	-¼	-½	-1	-2	-4

$y = 2^x$

reflection x axis

2) $y = -0.1(5)^{-x}$

reflection y-axis

x	-2	-1	0	1	2
y	-2.5	-0.5	-0.1	-0.02	-0.004

$y = -0.1(5)^{-(1)}$

$y = -0.1\left(\frac{1}{5}\right)$

$y = -0.02$
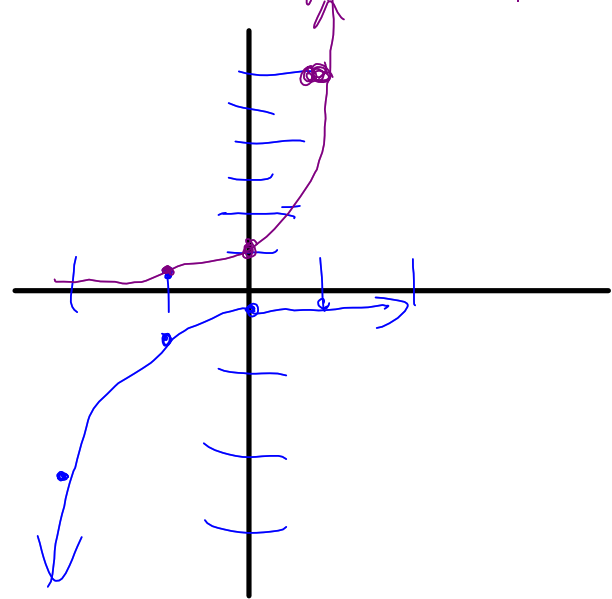
$y = -0.1(5)^{-(2)}$

$= -0.1\left(\frac{1}{25}\right)$

$y = -0.1(5)^{-(-1)}$

$= -0.1(5)^{1}$

$= -0.5$

Parent function
$y = 5^{x}$

x	-2	-1	0	1	2
y	$\frac{1}{25}$	$\frac{1}{5}$	1	5	25

3) $y = 2^x + 1$ up 1

x	-2	-1	0	1	2
y	$\frac{5}{4}$	$\frac{3}{2}$	2	3	5

Parent
$y = 2^x$

x	-2	-1	0	1	2
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4
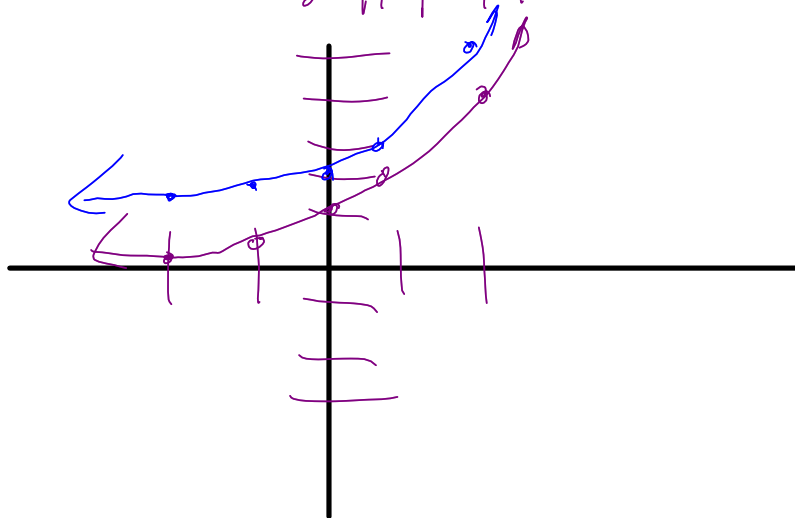
The number e. The number is 2.71828....

 - is an irrational number

 - used to calculate interest compounded continuously,

   -   Calculus - finding the slope of a curve at any given point, area under a curve, equations for sound waves, light waves.......

- the inverse of an ln (natural log)

Use the graph of $y = e^x$ to evaluate each expression to four decimal places.

4) $e^{\frac{1}{4}}$

$\frac{1}{4}$ 2nd LN

1.2840

(5) e^{-4}

0.0183

(6) $e^{3.5}$

33.1155

Find the amount in a continuously compounded account for the given conditions.

7) principal: $20,000
annual interest rate: 3.75%
time: 2 years

Quarterly $n = 4$
$t = 2$
$r = .0375$
$P = 20,000$

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$20000\left(1 + \frac{.0375}{4}\right)^{4 \cdot 2}$$

$$20,000(1 + .009375)^8$$

$$20,000(1.009375)^8 = \$21,550.15$$

How long would it take to double your principal at an annual interest rate of 3.75% compounded continuously?

$$A = Pe^{rt} = 20,000e^{.0375(2)}$$

$$= 20,000e^{.075} = \boxed{21,557.69}$$

8) The isotope Hg-197 is used in kidney scans. It has a half-life of 64.128 h. After that time, half the isotope will have decayed. Write the exponential decay function for a 12-mg sample. Find the amount remaining after 72 h.

$$12\left(\frac{1}{2}\right)^{72/64.128}$$

$$12(0.5)^{1.122754491}$$

$$\approx 5.5 \text{ mg after 72 hours.}$$

9) Suppose you won a contest in 6th grade that deposited $5000 in an account that accrued interest continuously at a rate of 4.5%. How much will you have in the account when you enter high school 3 years later, and how much would you have when you graduate?

a) $5000(e)^{3(.045)}$

$5000(e)^{.135}$

$\$5722.68$

b) $5000(e)^{7(.045)}$

$5000e^{.315}$

$\$6851.30$

Parent function= a= y-intercept

The parent function for each graph below is of the form $y = ab^x$. Write the parent function. Then write a function for the translation indicated.

b= relationship of the y-values

10)
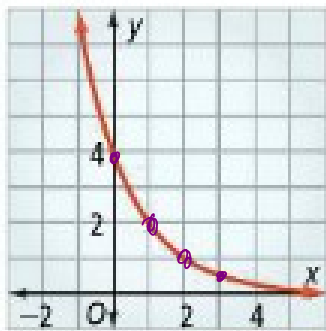
$a=4$
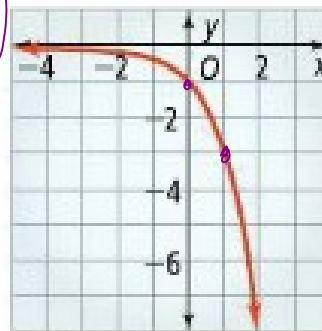
translation: left 4 units, up 3 units

Parent
$$y = 4\left(\frac{1}{2}\right)^x$$

transformation
$$y = 4\left(\frac{1}{2}\right)^{x+4} + 3$$

11)

$a = -1$

translation: right 8 units, up 2 units

Parent $y = -1(3)^x$

$$y = -1(3)^{x-8} + 2$$